

## TECHNOLOGY NEEDS/OPPORTUNITIES STATEMENT

### TANK REMEDIATION FOR BUILDING 324

**Identification No.:** RL-DD09

**Date:** November 2001

**Program:** 300 Area Facility Transition

**OPS Office/Site:** Richland Operations Office/Hanford Site

**PBS No.:** RL-RC06

**Waste Stream:** Processing tanks in 324 High-Level-Vault (HLV) and Low-Level-Vault (LLV)

**TSD Title:** N/A

**Operable Unit (if applicable):** N/A

**Waste Management Unit (if applicable):** N/A

**Facility:** Building 324

#### **Priority Rating:**

This entry addresses the "Accelerated Cleanup: Paths to Closure (ACPC)" Priority:

- ☐ 1. Critical to the success of the ACPC.
- ☒ 2. Provides substantial benefit to ACPC projects (e.g., moderate to high life-cycle cost savings or risk reduction, increased likelihood of compliance, increased assurance to avoid schedule delays).
- ☐ 3. Provides opportunities for significant, but lower cost savings or risk reduction, and may reduce uncertainty in ACPC project success.

**Need Title:** Tank Remediation for Building 324.

**Need/Opportunity Category:** *Technology Opportunity* -- The Site desires an alternative to the current baseline technology.

**Need Description:** Methods are needed for characterization, decontamination and/or stabilization, size-reduction and/or removal of HLW and LLW tanks located in below-grade vaults.

#### **Schedule Requirements:**

Earliest Date Required: (02/08/02)

Latest Date Required: (01/30/03)

**Problem Description:** One of the major sub-projects required for deactivation of Hanford's 324 Facility involves the removal and disposal of four tanks located in the 324 high-level vault (HLV). Over the past several decades, radiochemical waste researchers used these tanks (T-104, T-105, T-106 and T-107) to support the development and

demonstration of chemical and thermal treatment processes. These tanks have limited access, with all pipes having welded connections. Tank T-105, which contains about 70% of the total curie inventory of waste in the vault is located directly beneath the 6-ft-thick, concrete shielding cover/access blocks, and has a very high source term estimated to be 10,000 curies of Cesium 137/Barium 137 with an estimated equivalent amount of Strontium 90/Yttrium 90. The present Project Management Plan (PMP) specifies that Tank T-105 must be emptied and removed before the rest of the HLV tanks can be deactivated. Based upon this approach, the deactivation of Tank T-105 presents the following challenges:

- Inspection – cameras or other imaging equipment must be deployed in the tank to view the internals and the suspected waste heel
- Radiation Monitoring – characterization and dose profiling equipment must be deployed in the tank for data collection
- Sampling – samples from various locations within the tank may need to be retrieved and analyzed
- Decontamination – waste contents should be removed or fixed/stabilized prior to tank removal and size reduction
- Removal – tank T-105 must be removed to gain access to the remaining three tanks in the HLV

Tanks in the 324 Low-Level Vault present similar challenges. A similar need is also documented for Hanford's 340 Vault tanks – See Need RL-DD082.

***Potential Life-Cycle Cost Savings of Need (in \$000s) and Cost Savings Explanation:***

The current baseline cost for HLV tanks remediation activities is estimated at \$2.7M. While technology options studies to support the tank remediation were initiated in FY00, the baseline plan requires specific definition of workscope and technologies to be completed in FY 2003. Simply assuming a 10% efficiency in the current baseline cost assumptions would yield a \$270K cost savings.

***Benefit to the Project Baseline of Filling Need:*** Decontamination or removal of the HLV tanks would eliminate a significant source term within the 324 Facility.

***Relevant PBS Milestone:***

TRP-06-921	324 Deactivation Complete	September 22, 2006
------------	---------------------------	--------------------

***Functional Performance Requirements:*** Remote techniques are needed to remove tank heels or prevent dispersion of contamination on cutting or disassembly. The residual material ranges from low-level to high-level material with potential for TRU waste. The residues are in the form of liquids, liquid sludges, solids and dispersible material.

***Work Breakdown***

***Structure (WBS) No.:*** 1.04.10, 324/327 Buildings Stabilization/Deactivation

**TIP No.:** TRP-04-904, Select Technologies for Highly Contaminated Tank Removal in 324, February 8, 2002

***Justification For Need:***

***Technical:*** The closure plan for the facility requires removal of the tanks. Reduction of the radiological fields because of the residual heels will be required to allow for size reduction and removal.

***Regulatory:*** Tri-Party Agreement Milestone M-89-00: Complete Closure of the Non-permitted MW Units of the 324 REC, HLV and LLV by October 2005.

***Environmental Safety & Health:*** There are potential worker safety concerns associated with exposure during removal operations.

***Cultural/Stakeholder Concerns:*** N/A. Required prior to closure.

***Other:*** None identified.

***Current Baseline Technology:*** Specific technologies have not been selected, however, the current baseline includes tank and piping integrity assessments followed by system flushing, decontamination and either in-situ size reduction or whole tank removal.

***End-User:*** EM-40.

***Contractor Facility/Project Manager:*** Malcolm S. Wright, Director - 324 Facility Deactivation Project, Fluor Hanford (FH) (509) 373-5864, Fax: (509) 373-0139, [Malcolm S \(Mal\) Wright@rl.gov](mailto:Malcolm_S_(Mal)_Wright@rl.gov)

***Site Technical Point-of-Contact:*** Gregory T. Berlin, Fluor Hanford (FH), (509) 376-2389, Fax (509) 376-1045, [Gregory T Berlin@rl.gov](mailto:Gregory_T_Berlin@rl.gov).

***DOE End-User/Representative Point-of-Contact:*** David T. Evans, U.S. Department of Energy, Richland Operations Office (DOE-RL), (509) 373-9278, Fax: 372-3508, [David T Evans@rl.gov](mailto:David_T_Evans@rl.gov).